METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
TEL 510.817.5700
TDD/TTY 510.817.5769
FAX 510.817.5848
E-MAIL info@mtc.ca.gov
WEB www.mtc.ca.gov

ARTERIAL OPERATIONS COMMITTEE (AOC)

10 A.M. – 12 P.M., Tue., Jan. 10, 2012
Joseph P. Bort MetroCenter
Conference Room 171
101 Eighth Street
Oakland CA 94607-4700

Chair: David Kobayashi, VTA
Vice-Chair: David Mahama, DKS
Staff Liaisons: Vamsi Tabjulu, MTC
Danielle Stanislaus, MTC

The Arterial Operations Committee (AOC) oversees the Bay Area's efforts to improve arterial efficiency and safety. This Committee membership is open to traffic engineers in the public and private agencies in the Bay Area. For more information, please email vtabjulu@mtc.ca.gov or visit the Arterial Operations Program website at http://www.mtc.ca.gov/services/arterial_operations/.

AGENDA

1. **Introductions** (Kobayashi)
   - *Notes from meeting on November 01, 2011**
2. **Regional Transportation Plan (RTP) Update** (Stanislaus)
3. **Tech Transfer Seminar** (Stanislaus)
4. **NCHRP 20-68A Domestic Scan 07-04 Program*** (Stanislaus/Tabjulu)
   - *Best Practices in Regional, Multi-Agency Traffic Signal Operations Management Workshop – Feedback*
5. **Program for Arterial System Synchronization (PASS)*** (Tabjulu)
   - *PASS FY10/11 Cycle - Fact Sheets*
   - *PASS FY11/12 Cycle - Project Status Updates*
   - *PASS FY12/13 Cycle - Draft Program Guidelines*
5. **Bay Area Signalized Intersection System (BASIS)** (Stanislaus)
6. **Draft Work Plan for AOC 2012*** (Stanislaus/Tabjulu)
7. **New Business** (All)

**Attachment in the packet*

Next Meeting: Tue., Mar. 13, 2012 at 10 A.M., Room 171

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Arterial Operations Committee

Notes from meeting on November 01, 2011

1. Introductions

- All members introduced themselves. The meeting notes from the September 13, 2011 meeting were approved as written.

2. Regional Transportation Plan (RTP) Update

- Danielle Stanislaus reported that the FPI RTP submittal for $4.5 billion, which includes the arterial operations component, is showing a significant benefit-cost ratio compared to the other programs. She said that she is meeting with staff from various agencies to identify services and projects common in both the local and regional MTC application to avoid duplicating the project costs and benefits.

3. Tech Transfer Seminar

- Vamsi Tabjulu said that the next Tech Transfer Seminar on "HCM 2010 and CA MUTCD 2012: Updates Relating to Arterials" will be scheduled for the first quarter of 2012. He said that since there have been extensive revisions to various chapters, this seminar will only highlight the updates affecting arterial operations. He said that the following speakers have confirmed their participation in the seminar: Richard Dowling (Dowling Associates, Inc) to present on HCM 2010 Updates; and Johnny Bhullar and Einar Acuna (Caltrans) to present on CA MUTCD 2012 Updates. He said that since the CA MUTCD will be adopted in Jan. 2012, the update would be referred to as CA MUTCD 2012. He said that the final outline presented incorporates comments from the proposed speakers. He said each topic will be covered in 75 min, including the Q&A. He said that the seminar date will be decided based on the availability of the speakers and the MTC Auditorium, and the seminar flyer and registration information will be emailed to the AOC.

4. Program for Arterial System Synchronization (PASS)

- Vamsi provided an update on the 13 projects in the PASS FY10/11 Cycle and said that 34 GPS clocks were installed to successfully coordinate various Caltrans and local signals. He provided an overall summary of various benefits from the projects. He said that the total emissions (ROG, NOx, PM10 and CO) reduction of over 712 tons was achieved. He said that the total project costs, including estimated staff costs, was about $1.26 million resulting in total benefits of over $101.7 million achieved from travel-time savings, emissions reductions and fuel consumption savings. He said that the overall benefit-cost ratio is about 80:1 (for all 13 projects without transit benefits), and a ratio of 70:1 (for 10 projects with transit benefits).
- For the PASS FY11/12 Cycle, he said that MTC, in partnership with Caltrans and all project stakeholders, has completed the kick-off meetings for all projects. He said that the City of Livermore/Caltrans project has been cancelled due to construction delays in the project corridor. He said that Workscope, Schedule, and Budgets were finalized for a majority of projects and the remaining would be finalized by the end of Nov. He outlined the project services and budget for all 21 projects consisting of over 341 signals, including 32 Caltrans signals.
- He said that the revisions to the program guidelines for PASS FY12/13 Cycle will be discussed at the Jan. 2012 meeting. He requested the members to participate in the discussions and provide comments before the due date for consideration.

5. Bay Area Signalized Intersection System (BASIS)

- Danielle said that the BASIS database will be primarily used by MTC to complete the needs assessment for arterials in the subsequent RTP. She said the database will be limited to authorized users with features to limit and log all edits and entries. She said that the database has several features to locate bus routes and stops, schools, landmarks and other features to do additional analysis using policy layers. David Kobayashi (VTA) emphasized the need for an accurate database to serve the growing needs of the region.

6. Other Business

- Danielle said that a FHWA-sponsored workshop on Active Traffic Demand Management (ATDM) will be hosted in the MTC Auditorium on Jan. 5, 2012. She said that the workshop flyer is included in the AOC packet and said that information on workshop registration will be sent to the AOC mailing list when available.
- Albert Yee, MTC Director of Highway and Arterial Operations, presented a Certificate of Appreciation to outgoing chair Dean Hsiao (San Leandro) in recognition of his 3 years of service as Vice-chair and Chair to the AOC. Members present at the meeting took a group photograph and attended a brief reception in honor of the outgoing Chair. The photos are posted on the Arterial Ops website. Members supported the staff's recommendation to retain David Mahama (DKS) as the Vice-Chair and elect David Kobayashi (VTA) as the Chair for the AOC 2012.

7. Adjournment: The meeting adjourned at 12:00 P.M.

Arterial Operations Committee

Attendees from meeting on November 01, 2011

#	Name	Agency	Phone No.	E-Mail
1	Albert Yee	MTC	510.817.5770	ayee@mtc.ca.gov
2	Barry Rodinsky	Econolite	510.562.3215	brodinsky@econolite.com
3	Brian Burkhard	Transpo	415.747.1008	brian.burkhard@transpogroup.com
4	Brian Sowers	Kimley-Horn	925.398.4862	Brian.Sowers@kimley-horn.com
5	Daniel Yau	Y&C	916.789.7487	dyau@yctransportation.com
6	Danielle Stanislaus	MTC	510.817.5737	dstanislaus@mtc.ca.gov
7	David Kobayashi	VTA	408.321.5892	david.kobayashi@vta.org
8	David Mahama	DKS	510.267.6613	dcm@dksassociates.com
9	Dean Hsiao	San Leandro	510.577.3410	dhsiao@ci.san-leandro.ca.us
10	Deborah Fehr	San Ramon	925.973.2657	dfehr@sanramon.ca.gov
11	Helena Allison	Napa	707.257.9523	hallison@cityofnapa.org
12	J.D.Margulici	Novavia	510.978.1150	jdm@novavia.us
13	Jason Nutt	Novato	415.899.8963	jnutt@notato.org
14	John Neville	Marin Co	415.499.3077	jneville@co.marin.ca.us
15	John Rudolph	WCCTAC	510.215.3042	JohnR@ci.san-pablo.ca.us
16	Joy Bhattacharya	TJKM	925.463.0611	jbhattacharya@tjkm.com
17	Kevin Fehon	DKS	510.267.6608	kjf@dksassociates.com
18	Nayan Amin	URS	408.297.9585	nayan_amin@urscorp.com
19	Rob Gill	Caltrans	510.286.4625	Robgill@dot.ca.gov
20	Simin Timuri	Walnut Creek	925.256.3529	timuri@walnut-creek.ca.us
21	Steve Fitzsimons	Republic ITS	510.440.8127	sfitzsimons@RepublicITS.com
22	Tiffany Barkley	BTS	510.295.4592	tiffany@bt-systems.com
23	Tony Chu	TJKM	925.463.0611	tchu@tjkm.com
24	Vamsi Tabjulu	MTC	510.817.5936	vtabjulu@mtc.ca.gov
25	Wladimir Wlassowsky	Oakland	510.238.6383	wwlassowsky@oaklandnet.com

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101 Eighth Street
Oakland, CA 94607-4700
Tel: 510.464.7700
TDD/TTY: 510.464.7769
Fax: 510.464.7848

Memorandum

TO: Arterial Operations Committee DATE: January 03, 2012

FR: Danielle Stanislaus, Vamsi Tabjulu W. I.: 1234

RE: **NCHRP 20-68A US Domestic Scan 07-04 Program**

Best Practices in Regional, Multi-Agency Traffic Signal Operations Management Workshop - Feedback

MTC was invited to participate in a Domestic Scan Workshop on *Best Practices in Regional, Multi-Agency Traffic Signal Operations Management* in southern CA from Nov. 7-9, 2011. The workshop participants included over 15 public agencies from all over the US, including several DOTs, MPOs and local entities involved in managing successful signal operations programs of various sizes and shapes.

The workshop included presentations from various agencies to cover the following topics: RTSOP Goals and Objectives; Structure and Governance; Institutional Arrangements and Agreements; System Operations; Performance Measures; Sustaining and Expanding Programs; System and Hardware Maintenance; and Funding. The workshop facilitated the interaction of agencies at local, regional, and state levels to ensure effective traffic operations and system maintenance. This scan helped to build a domestic network of knowledge and peer exchange to gain insight on the best practices, organizational structures, technologies, and lessons learned to catalyze the development of regional traffic signal management programs. This domestic scan provided MTC an opportunity share experience and knowledge about our Arterial Ops programs.

Specific objectives of the scan were to:

- Examine the components of cooperative agreements that foster and enable regional traffic signal coordination and management.
- Examine if, and how, the regionalization of traffic signal coordination reduces travel time, stops, and delays on arterials that traverse multiple jurisdictions.
- Examine how the concept of regional traffic signal management and operations allows resource sharing and consistent operation of traffic signals.
- Examine certification and training needs of operations and maintenance staff involved in the effort.
- Explore the funding mechanisms in place to sustain regional traffic signal operations and how participating agencies contribute to management operations and maintenance expenses.
- Identify technical challenges to overcome and strategies to ensure the effective coordination of traffic signal timing across multiple jurisdictions.

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Memorandum

TO: Arterial Operations Committee DATE: January 03, 2012

FR: Vamsi Tabjulu W. I. 1234

RE: **Program for Arterial System Synchronization (PASS)**

The purpose of the Program for Arterial System Synchronization (PASS) is to provide technical and financial assistance to Bay Area agencies to improve the safety and efficiency of the operations of certain traffic signal systems/corridors. The PASS provides traffic engineering assistance to local jurisdictions in retiming their traffic signals, including developing transit signal priority plans, incident management flush plans, traffic responsive timing plans, and establishing communication between state and local signals, among other eligible services. MTC will administer and manage this program, but the primary responsibility for the operation and retiming of traffic signals resides with the agency that owns them. The PASS guidelines and more information is available on the MTC Arterial Ops website at: http://www.mtc.ca.gov/services/arterial_operations/

PASS FY 10/11 Cycle - Fact Sheets

This cycle consists of 13 projects with 329 traffic signals owned by the state, county or local agencies in the Bay Area. MTC, in partnership with Caltrans and the local agencies, has successfully implemented these projects. GPS clocks were installed at various locations to enable the coordination of state and local signals along some major arterials in the Bay Area. MTC is in the process of archiving the deliverables, counts, travel-time runs and transit evaluation data for future use.

MTC produced a fact sheet for the City of Walnut Creek/Caltrans project to present at the City's Transportation Commission Meeting in November. This fact sheet has the project overview, study area map, comparison charts, benefits to various modes, and the benefit-cost analysis information at a glance. This was internally produced by MTC and was well received by the commission members and staff. MTC has decided to produce these fact sheets for each of the projects completed in the PASS to help bring awareness of the program and publicize the benefits to various modes through effective signal operations. The fact sheet for the City of Napa/Caltrans project was also produced for the staff meeting with the City's Deputy Public Works Director. These two fact sheets are attached in the following pages.

Program for Arterial System Synchronization (PASS) FY10/11 Project

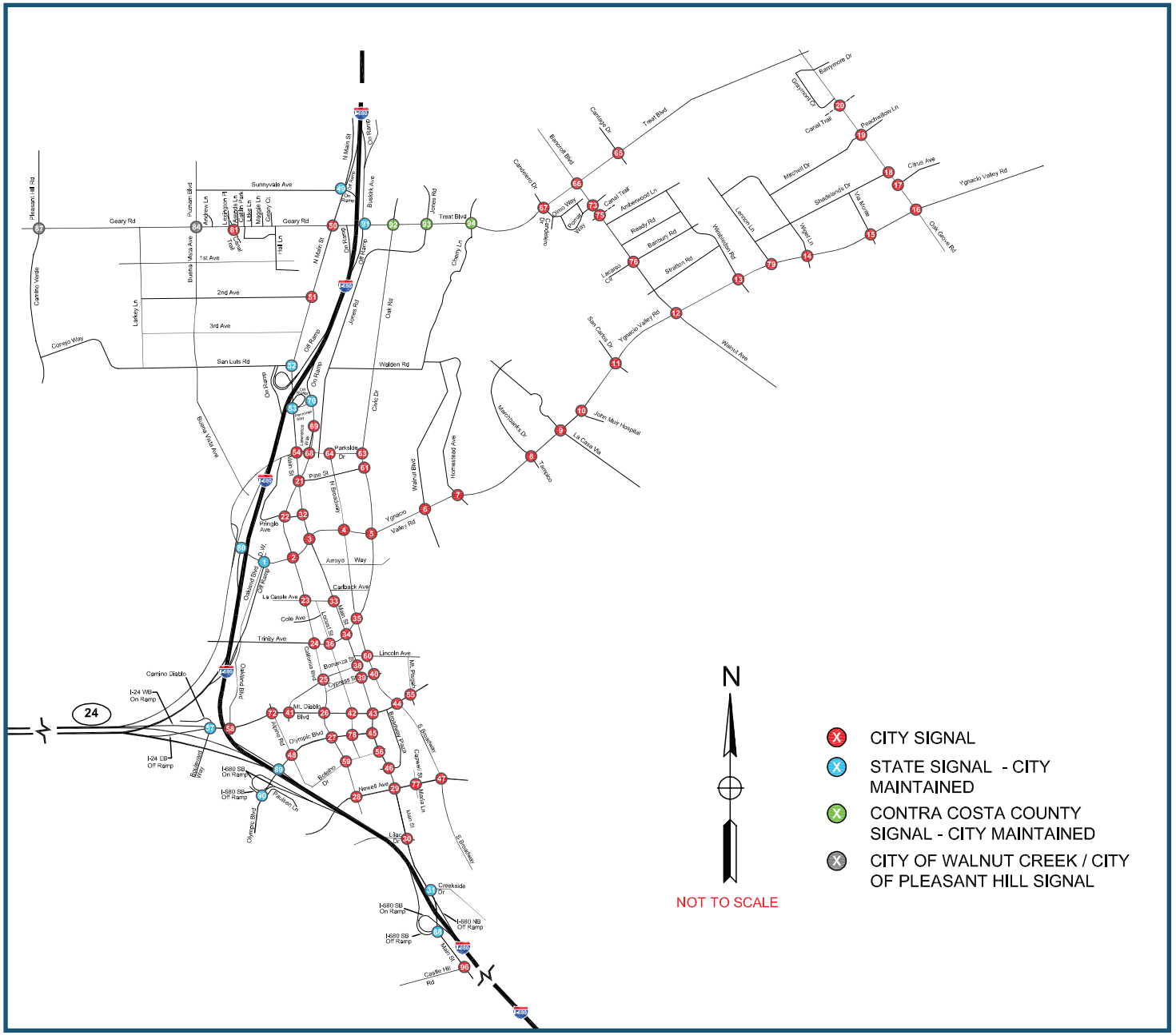
City-wide Traffic Signal Timing Project

City of Walnut Creek I Caltrans I Metropolitan Transportation Commission

Project Overview

The City of Walnut Creek received a grant from MTC's Program for Arterial System Synchronization (PASS) to conduct a citywide signal timing study and develop optimized signal timing plans for 87 intersections. Previous signal timing plans for the intersections were developed and three years ago, when traffic volumes and policy directives were very different. All of the intersections are fully-actuated, have Naztec 2070 controllers, and are connected to the City's ATMS via copper signal interconnect. The locations of the 87 signals are shown on the map to the right.

The goal of the project was to update signal coordination plans to respond to changes in travel patterns and volumes, as well as recent changes to CA policy guidelines. The project developed traffic signal coordination timing plans for the a.m., midday and p.m. peak periods. Main St, California Blvd, Mt. Diablo Blvd, Olympic Blvd, Ygnacio Valley Rd and Treat Blvd carry a significant amount of regional traffic to and from the City of Concord, Pleasant Hill and other cities in eastern Contra Costa County, in addition to the local City traffic.



Benefits to Side Streets: Since the last time the traffic signals were retimed in 2007, there have been changes to the traffic patterns and volumes. The new timing plans were developed and implemented to achieve progression along the main corridors while at the same time minimize the delays along the side streets.

Benefits to Traffic Safety: To enhance traffic safety and be consistent with the new CA MUTCD guidlines and posted speed limits, the yellow clearance time was updated along the study corridors to reduce right-angle and rear-end vehicular collisions. Implementation of additional clearance time at the study intersections provides more time to the vehicular traffic to clear or stop safely at the intersection.

Benefits to Pedestrians: Per the new CA MUTCD guidelines, the pedestrian walking speed was reduced to 3.5 feet per second (previously 4.0 feet per second). At intersections near schools or senior centers, the clearance timing parameters were updated to provide adequate time for children and seniors to safely cross the intersections.

Benefits to Transit: The project included an evaluation of the effect of the new timing plans on transit. Travel time runs were conducted by the PASS consultants on transit vehicles both before and after the new timings were implemented, so as to assess the impacts on transit. These evaluation results demonstrate that the program continues to provide significant mobility and environmental benefits across modes at relatively low costs. The transit travel-time savings and average speed increase is shown in the table to the right.

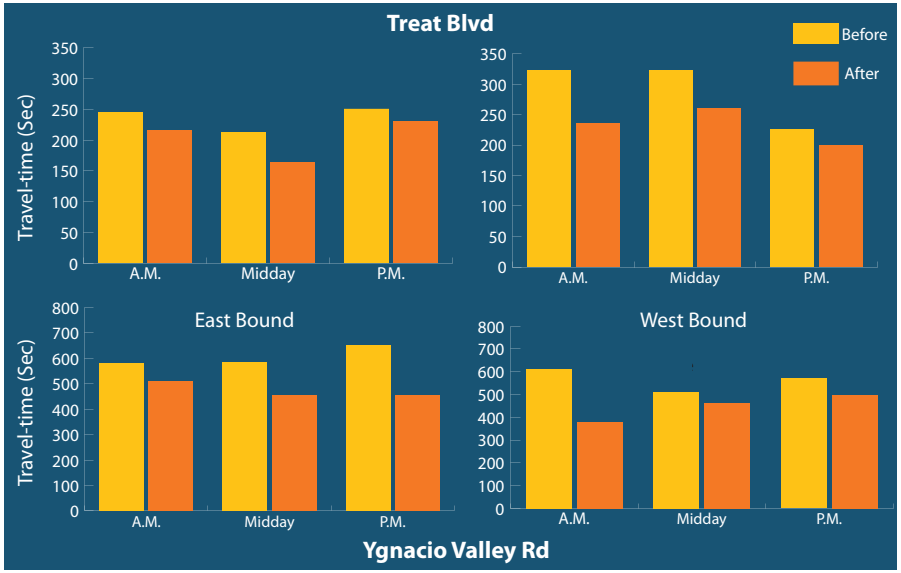
Project Costs	
Consultant Costs (Basic Services/Plans)	$234,440
Agency Staff Costs (estimated)	$58,610
Total Costs	**$293,050**

Project Benefits

Measures	*Annual Average*		*Lifetime (5 Years)*	
	Savings	*Monetized Savings*	*Savings*	*Monetized Savings*
Travel Time Savings (hrs)	175,067	$3,040,512	875,333	$15,202,560
Fuel Consumption Savings (gal)	661	$2,027,613	3,304,813	$10,138,065
ROG Emissions Reduction (tons)	4.3	$5,227	21.6	$26,134
NOx Emissions Reduction (tons)	5.3	$91,591	26.5	$457,957
PM10 Emissions Reduction (tons)	0.8	$117,590	4.2	$587,949
CO Emissions Reduction (tons)	30	$2,229	150	$11,146
		Total Lifetime Benefits		**$26,423,810**
Transit Travel Time Savings (hrs)	8,147	$141,495	40,735	$707,474
		Total Lifetime Benefits with Transit		**$27,131,834**

Overall Project Benefits	*Auto*	*Transit*
Average Decrease in Travel Time	**21%**	**7%**
Average Speed Increase	**30%**	**9%**
Average Fuel Savings	**16%**	**N/A**
Average Reduction in Stop Delay	**45%**	**N/A**
Average Reduction in Number of Stops	**49%**	**N/A**

Benefit/Cost Ratio	**90:1**
Benefit/Cost Ratio with Transit	**93:1**



Project Benefits Summary

Average Reduction in Auto Stop Delay: 45%

Average Reduction in Number of Auto Stops: 49%

Auto Fuel Consumption Savings: 16% or 3,304,813 gallons

Total Auto Emissions Reduced (ROG, NOx, PM10, CO): 202.3 tons

Auto Travel Time Savings: 21% or 875,333 hours

Transit Travel Time Savings: 7% or 40,735 hours

Overall Project Benefit-cost Ratio = 93:1

MTC CONTACT:

Danielle Stanislaus
Senior Planner and Program Manager
DStanislaus@mtc.ca.gov
510.817.5737

Vamsi Tabjulu
Arterial Operations Program Manager
VTabjulu@mtc.ca.gov
510.817.5936

MT

CITY OF WALNUT CREEK

Caltrans

Program for Arterial System Synchronization (PASS)

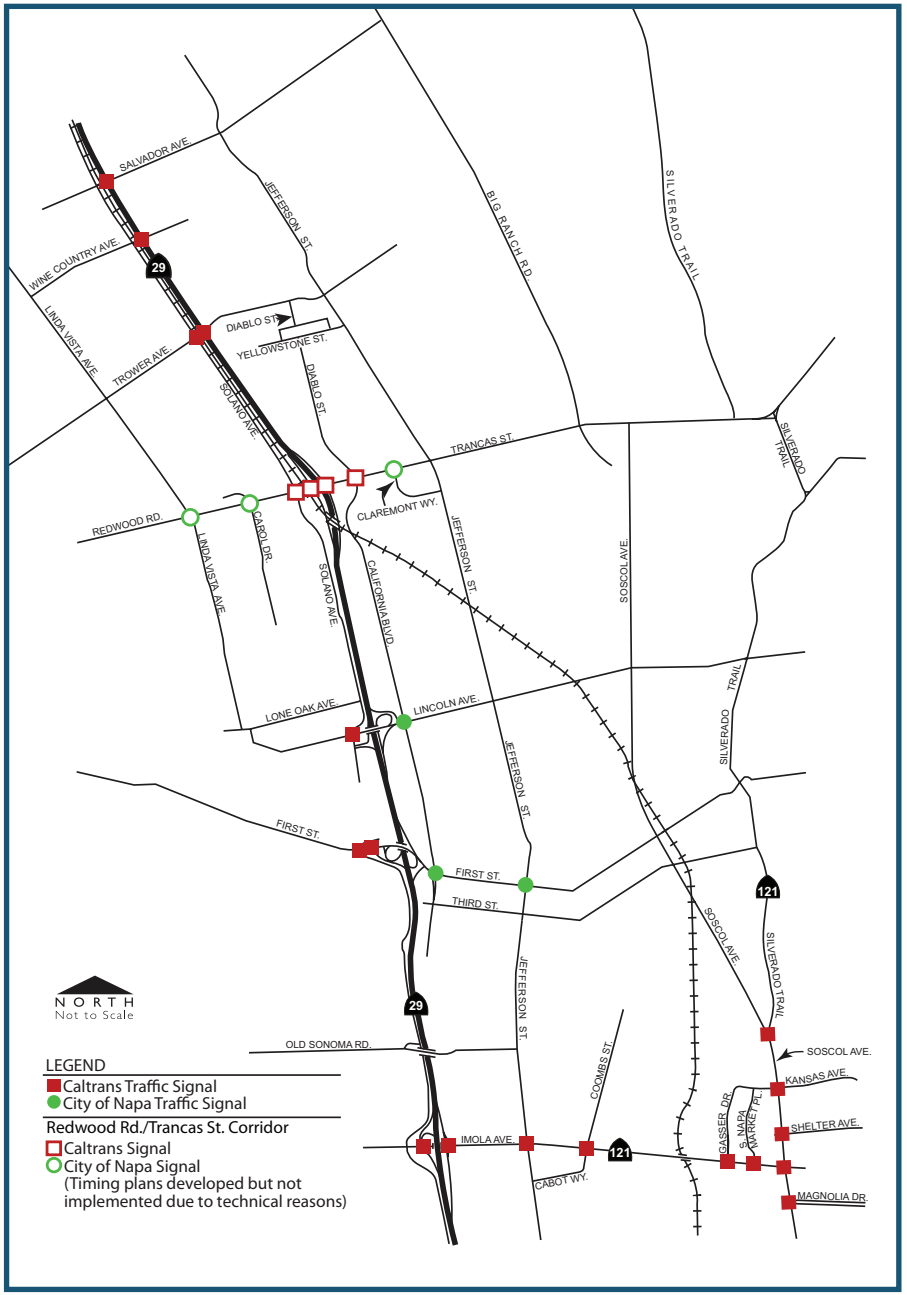
FY 10/11 - Traffic Signal Timing Project

City of Napa | Caltrans | Metropolitan Transportation Commission

Project Overview

The City of Napa received a grant from MTC's Program for Arterial System Synchronization (PASS) to conduct a signal timing study and develop optimized signal timing plans for 26 signals along the State Route 29, Redwood Rd/Trancas St, Lincoln Ave, First St, Imola Ave (Highway 121), and Soscol Ave Corridors. Caltrans owns and operates 20 signals and the City of Napa owns and operates the remaining six signals. The Caltrans traffic signals operate with model 170 controllers with Caltrans C.8 software, and the City's traffic signals operate with Naztec TS2 controllers (980 series). The Caltrans signals are interconnected via copper hardwire and four of the traffic signals are interconnected to the City's Streetwise traffic signal system. The project corridors and signals are shown in the map to the right.

The goal of this project is to develop traffic signal timing plans for the weekday a.m., midday, and p.m. peak periods to reduce traffic congestion, traffic delays, greenhouse gases, and travel times along the study corridors, and improve traffic safety. Review of the signal coordination plans is warranted to respond to changes in travel patterns and volumes, as well as recent changes to CA policy guidelines.



Signal Communcations

As a part of the project, communication was established between the Caltrans and the City's traffic signals in three corridors as described below:

Redwood Road/Trancas Street - The City was permitted by Caltrans to install signal interconnect cable through the existing Caltrans conduit in the bridge. The City's contractor secured a Caltrans permit to complete the work and MTC provided the required funds for the City. Also, one GPS clock was installed at the Trancas St/California Blvd intersection to enable communication between the City and Caltrans traffic signal systems.

Lincoln Avenue - MTC also provided funds to install two Actellus units to enable traffic signal communication between the City and Caltrans signals.

First Street - Funds were provided to run an interconnect cable on First St between California Blvd and Jefferson St, and two GPS clocks were installed at the two Caltrans traffic signals.

MT CITY of NAPA Caltrans

Benefits to Bicyclists: Per the new CA policy directive, the min. green time was increased for the through movements at each study intersection to enhance safety for bicyclists traveling along the study corridors.

Benefits to Pedestrians: Per the new CA MUTCD guidelines, the pedestrian walking speed was reduced to 3.5 feet per sec. (previously 4.0 feet per sec.). At intersections near schools or senior centers, the clearance timing parameters were updated to provide adequate time for children and seniors to safely cross the intersections.

Benefits to Traffic Safety: To enhance traffic safety, and be consistent with the new CA MUTCD guidlines and posted speed limits, the yellow clearance time was updated along the study corridors to reduce right-angle and rear-end vehicular collisions. Implementation of additional clearance time at the study intersections provides more time to the vehicular traffic to clear the intersection or stop safely at the intersection. All red clearance timing parameters were updated based on the results of the collision analysis.

Benefits to Transit: The project included an evaluation of the effect of the new timing plans on transit. Travel time runs were conducted by the PASS consultants on transit vehicles both before and after the new timings were implemented, so as to assess the impacts on transit. These evaluation results demonstrate that the program continues to provide significant mobility and environmental benefits across modes at relatively low costs. The transit travel-time savings and average speed increase is shown in the table.

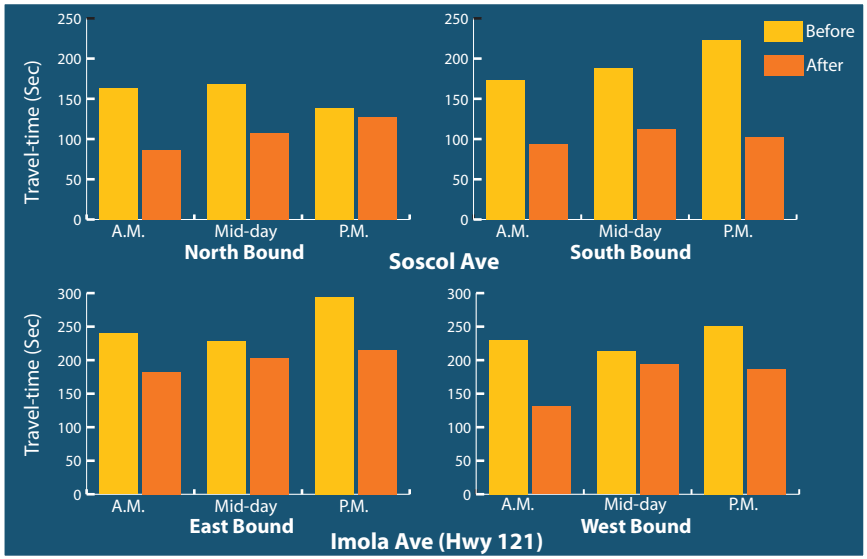
Project Costs	
Consultant Costs (Weekday Peak Coordination Plans)	$78,265
Other Project Costs (Communications equipment, etc.)	$14,518
Agency Staff Costs (Estimate)	$19,566
Total Costs	**$112,349**

Project Benefits

Measures	*Annual Average*		*Lifetime (5 Years)*	
	Savings	*Monetized*	*Savings*	*Monetized*
Travel Time Savings (hrs)	54,466	$945,954	272,331	$4,729,768
Fuel Consumption Savings (gal)	210,614	$646,092	1,053,068	$3,230,460
ROG Emissions Reduction (tons)	1.5	$1,802	7.4	$9,009
NOx Emissions Reduction (tons)	1.9	$32,206	9.3	$161,032
PM10 Emissions Reduction (tons)	0.3	$39,538	1.4	$197,688
CO Emissions Reduction (tons)	9.6	$709	47.8	$3,547
		Total Lifetime Benefits		**$8,331,504**
Transit Travel Time Savings (hrs)	696	$12,094	3,482	$48,731
		Total Lifetime Benefits with Transit		**$8,380,235**

Overall Project Benefits	*Auto*	*Transit*
Average Decrease in Travel Time	**27%**	**13%**
Average Speed Increase	**42%**	**17%**
Average Fuel Savings	**21%**	N/A
Average Reduction in Stop Delay	**63%**	N/A
Average Reduction in Number of Stops	**53%**	N/A

Overall Benefit-cost Ratio	**74:1**



Project Benefits Summary

Average Reduction in Auto Stop Delay: 63%

Average Reduction in Number of Auto Stops: 53%

Auto Fuel Consumption Savings: 21% or 1,053,068 gallons

Total Auto Emissions Reduced (ROG, NOx, PM10, CO): 65.9 tons

Auto Travel Time Savings: 27% or 272,331 hours

Transit Travel Time Savings: 13% or 3,482 hours

Overall Project Benefit-cost Ratio = 74:1

MTC CONTACT:

Danielle Stanislaus
Senior Planner and Program Manager
DStanislaus@mtc.ca.gov
510.817.5737

Vamsi Tabjulu
Arterial Operations Program Manager
VTabjulu@mtc.ca.gov
510.817.5936

CITY of NAPA

Caltrans

PASS FY11/12 Cycle – Project Status Updates

This cycle has a total of 21 projects consisting of 343 traffic signals from eight counties in the Bay Area. The first deliverable, the Workscope, Schedule, and Budget (WSB), has been finalized for all the projects. The project corridors, # of signals, services and current deliverable status are listed in the table: *PASS FY 11/12 Cycle – Project Services.* Please note that the # of project signals or services shown in the table reflects the accurate information of the project to date and may be different from what was reported earlier.

MTC successfully completed the procurement process for the GPS clocks and accepted a bid from McCain, Inc to provide all the clocks required for this cycle. The clocks will be delivered by the end of Jan. 2012. Upon receipt of the clocks, MTC will immediately ship the clocks to local agencies to install them at their respective signals. Considering the resource constraints at Caltrans, MTC will procure an electrical contractor to install the GPS antennas and units for the Caltrans signals. The Caltrans Traffic Operations staff will then configure these clocks to enable a common time-source for the signals in the corridor. MTC will actively coordinate this task with all stakeholders for successful implementation of the projects.

Table 1: PASS FY11/12 Cycle - Project Services

#	County	Sponsor Agencies	# of Signals			Corridor	Basic Servcies	Additional Services (#)		# of GPS Clocks			Consultant	Last Deliverable[1] Completed
			CT	Local	Total		Service	Other Plans/Services	Transit Evals	CT	Local	Total		
1	Alameda	**City of Berkeley**	0	27	27	University Ave; Sacramento Ave; 7th St	Weekday (AM/MD/PM)	Weekend (14)	Yes	0	3	3	KHA	**2B**
2	Marin	**City of San Rafael, Caltrans**	5	72	77	Downtown; Freitas; Anderson; Bellam Blvd	Weekday (AM/MD/PM)	None	Yes	5	2	7	KHA	**2A**
3	Contra Costa	**City of San Ramon**	0	14	14	Bollinger Canyon Rd	Weekday (AM/MD/PM)	School Peak Plans (6); Signal Phasing Analysis (14)	Yes	0	0	0	KHA	**2B**
4	Santa Clara	**County of Santa Clara, Caltrans**	1	23	24	Foothill Expy; Pagemill Expy	None	Traffic Responsive with IM Flush Plans	No	1	0	1	KHA	**2B**
5	Alameda	**City of Alameda**	0	10	10	Park St Corridor	Weekday (AM/MD/PM)	IM Flush Plans (10); ADT (1)	Yes	0	0	0	TJKM	**2B**
6	Contra Costa	**City of Brentwood, Caltrans**	1	11	12	Balfour Rd	None	School Regular AM/PM Peak (12); Wed PM Peak (3)	No	1	4	5	TJKM	**2A**
7	Marin	**County of Marin, City of Larkspur, Caltrans**	1	11	12	Sir Francies Drake Blvd	Weekday (AM/MD/PM)	Signal Controller Evaluation (1)	No	2	3	5	TJKM	**2A**
8	Santa Clara	**City of Mountain View, Caltrans**	3	4	7	N Rengstorff Ave	Weekday (AM/MD/PM)	None	Yes	0	5	5	TJKM	**2B**
9	Napa	**City of Napa, Caltrans**	6	7	13	Silverado Trail; Soscol Ave	Weekday (AM/MD/PM)	Weekend (6); School PM Peak (1)	No	6	1	7	TJKM	**1B**
10	Alameda	**City of Oakland**	0	14	14	Telegraph Ave	Weekday (AM/MD/PM)	None	Yes	0	13	13	TJKM	**2B**
11	Sonoma	**City of Petaluma, Caltrans**	2	12	14	Washington St	Weekday (AM/MD/PM)	Post Construction Plans (3); ADT (1)	Yes	2	0	2	TJKM	**2B**
12	Alameda	**City of San Leandro, Caltrans**	3	6	9	Hesperian Blvd	Weekday (AM/MD/PM)	None	No	1	0	1	TJKM	**2B**
13	San Mateo	**City of South SF, Caltrans**	3	5	8	Westborough Blvd	Weekday (AM/MD/PM)	School PM Peak (8)	Yes	0	3	3	TJKM	**1B**
14	Sonoma	**Town of Windsor, Caltrans**	0	4	4	US 101 Ramps; Local Raods	Weekday (AM/MD/PM)	Traffic Responsive Feasibility Study (4)	No	0	0	0	TJKM	**2A**
15	Contra Costa	**Town of Danville, County of Contra Costa, Caltrans**	0	22	22	Sycamore Valley Rd; Camino Tassajara	Weekday (AM/School PM/PM)	School PM Peak (instead of mid-day plans)	No	0	2	2	URS	**2A**
16	San Mateo	**City of East Palo Alto, Caltrans**	2	12	14	University Ave	Weekday (AM/MD/PM)	Weekend (8)	No	2	2	4	URS	**1B**
17	Alameda	**City of Fremont, Caltrans**	2	11	13	Decoto Rd; Fremont Blvd; Paseo Padre Pkwy	Weekday (AM/MD/PM)	None	Yes	2	0	2	URS	**2A**
18	San Mateo	**City of Menlo Park, Caltrans**	0	10	10	Willow Rd; SH 114	Weekday (AM/MD/PM)	None	Yes	0	10	10	URS	**1B**
19	Santa Clara	**City of Santa Clara, County of Santa Clara, Caltrans**	1	21	22	Great America Pkwy; Bowers Ave	Weekday (AM/MD/PM)	None	Yes	1	3	4	URS	**2A**
20	San Mateo	**County of San Mateo**	0	4	4	Alameda de las Pulgas	Weekday (AM/PM)	ADT (2)	No	4	0	4	URS	**2A**
21	Solano	**City of Suisun City, City of Fairfield, Caltrans**	4	9	13	SR 12; Local Roads	Weekday (AM/MD/PM)	Extended AM Peak (5 - 7AM)	Yes	4	9	13	URS	**1B**
Total			**34**	**309**	**343**					**31**	**60**	**91**		

[1] 1B = Final Detailed Workscope Schedule and Budget (DWSB); 2A = Draft Existing Conditions Report; 2B = Final Existing Conditions Report; 3A = Draft Recommendations Report; 3B = Final Recommendations Report; 4A = Final Timing Sheets; 4B = Final Project Report with Benefit-cost Analysis (Project Completion)

PROGRAM FOR ARTERIAL SYSTEM SYNCHRONIZATION (PASS)

DRAFT
Program Guidelines for
PASS FY12/13 Cycle of Projects

January 3, 2012

(Due Date for Comments: January 13, 2012)

METROPOLITAN
TRANSPORTATION
COMMISSION

Metropolitan Transportation Commission
Joseph P. Bort Metro Center
101 Eighth Street
Oakland CA 94612-3500
http://www.mtc.ca.gov/services/arterial_operations/

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1 Introduction

The purpose of the Program for Arterial System Synchronization (PASS) is to provide technical and financial assistance to Bay Area agencies to help improve the safe and efficient operation of certain traffic signal systems and corridors. The Transportation 2035 Plan provides approximately $1.25 million per year in CMAQ funds for traffic signal coordination under PASS. MTC will administer and manage this program, but the primary responsibility for the operation and retiming of traffic signals resides with the agency that owns them. Projects are defined by local agencies, evaluated by MTC staff, and assigned to consultants retained by MTC.

Under this regional program, technical assistance and financial support will be focused on traffic signal system projects that:

1. Interact with freeways and state highways;
2. Involve traffic signals from multiple jurisdictions;
3. Operate on corridors with established regional significance;
4. Provide priority for transit vehicles; and
5. Have been developed in conjunction with other regional programs.

1.1 Goals and Objectives

The goals and objectives of the PASS are as follows:

1. Establish and maintain communications between systems owned by Caltrans and local agencies. This could entail provision of GPS units, signal interconnect cable, or other technology to enable two-way communication and coordination, as well as retiming the signals once the new communications system is activated.
2. Coordinate local and state-owned signal systems, and retime signal systems in response to changes to the state-owned system. This would include changes resulting from freeway widening, reconfiguration of interchanges or intersections, implementation of ramp metering, or altering the lane configuration on state highways.
3. Retime traffic signal systems to support priority for transit vehicles. This would include active priority through signal preemption systems and passive priority through signal timing plans, and could include providing transit vehicles with rapid access/egress from major transit hubs.
4. Retime traffic signal systems in conjunction with other established regional programs, such as Safe Routes to Schools, Safe Routes to Transit, Complete Streets, SMART corridors, and Incident Management.

Typical tasks performed under the PASS to meet the above goals and objectives include, but are not limited to, the following:

1. Improve reliability and predictability of travel along arterial roads.

- Develop and implement signal coordination plans (a.m., p.m., and/or midday) that reduce travel time and delay on corridors that contain state and local signals.
- Collect peak period turning movement counts at all study intersections, including pedestrian and bicycle counts, and seven-day 24-hour machine counts at strategic locations to determine periods of coordination.
- Develop and implement signal coordination plans based on the throughput of people rather than vehicles.
- Develop and implement flush plans for arterials that are used as diversion routes in the event of freeway incidents, in conjunction with other incident management actions.
- Develop and implement optimized actuated settings for fully actuated signals to minimize queuing during non-peak periods.

2. Improve air quality through decreased motor vehicle emissions and fuel consumption.
   - Develop and implement signal coordination plans that reduce starts and stops and promote uniform travel speeds.
   - Develop and implement transit signal priority plans to make transit a more attractive travel option.
3. Improve the safety of motorists, pedestrians, and bicyclists.
   - Collect pedestrian and bicyclist volume data at the same time as vehicle count data at intersections to be coordinated.
   - Develop and implement signal coordination plans that promote uniform travel speeds, thereby reducing rear-end collisions.
   - Review existing pedestrian crossing times and bicycle detection at intersections to be coordinated, and recommend adjustments as necessary.
   - Review collision history for patterns that are susceptible to correction through signal timing and recommend adjustments as necessary.
4. Provide streamlined program administration and project management.
   - Provide high-quality technical assistance in a cost-effective manner.
   - Require local agency review and approval of timing plans prior to implementation.
   - Provide a peer review option to small agencies that do not have in-house traffic engineering staff.
   - Use data on the quality of the deliverables and the number of projects completed within schedule and budget to guide assignment of projects to consultants in subsequent cycles.
   - Facilitate interagency communication and coordination.

2 Eligibility

The applicant for PASS funds must be a Bay Area public agency, and must either be an owner of the traffic signal system addressed in the application, or authorized to act on behalf of multiple agencies (e.g., a smart corridor) that own the traffic signal system(s) addressed in the application. For an applicant to apply on behalf of other agencies, the applicant must have the other agencies sign the application or submit letters of support for the proposed project that authorize the applicant to apply on their behalf. It is the responsibility of each applicant to ensure all local funding and approval requirements are met.

Applicants for projects that involve Caltrans traffic signals do not need to submit letters of support or signatures from Caltrans since these applications will be reviewed by MTC and

Caltrans after submission. Project sponsors are required, however, to notify the appropriate Caltrans traffic operations staff about their PASS application if it includes Caltrans signals. If any additional information is needed from Caltrans to complete the application, the project sponsor must coordinate with Caltrans at least two weeks in advance of the application submittal deadline.

All agencies that are involved in a project must also satisfy the following requirements:

1. Indemnify MTC by signing an indemnification agreement† **before** any work on the project begins;
2. Provide staff time to review and approve project deliverables as per the schedule;
3. Provide staff to install any GPS clocks for their signals;
4. Provide staff time to assist consultants with implementing timing plans; and
5. Commit to completing the project within one year of the award date.
6. Notify MTC if there are issues after the field implementation and changes are made to the timing plans within one year after the project is implemented.

† *This agreement is valid indefinitely, and the agencies with a valid agreement on file from a PASS FY10/11 or FY11/12 project are not required to submit this agreement.*

2.1 Eligible Projects

To be eligible for PASS funds, a project must entail retiming traffic signal systems, consistent with the purposes set forth in Section 1.1. As part of the application, the project sponsor must demonstrate how the proposed project meets the goals and objectives described in Section 1.1. There is no maximum funding for a project. While there is no maximum number of projects that may be submitted for consideration, it is unlikely that more than two projects will be awarded to the same project sponsor in a year.

In addition to the basic signal coordination, the scope of the PASS program includes providing additional services like incident management flush plans, transit signal priority plans, traffic responsive timing plans, weekend timing plans, additional timing plans, technical studies, feasibility studies, evaluation of transit benefits, etc. These services should be requested by the project sponsor in the application and will be included in the Workscope, Schedule and Budget (WSB), contingent on approval by MTC. Consultant may also be requested to perform these additional services for any projects retimed in the last two years under the PASS FY10/11 or FY 11/12 Cycles. Such services may increase the scope of the work to include additional meetings, additional data collection, field visits, technical analyses, studies, fine-tuning, conditional diagrams, updating Visio coversheets, etc.

Traffic signal retiming projects must involve a minimum of eight signalized intersections with interconnection or reliable time sources, and are currently capable of coordinated operation, unless the project application requests funding for establishing communication. Improvements to communication systems are eligible, but limited to a maximum of $10,000 per project. Capital improvements funded with PASS federal funds will be limited to communication systems, and will be capped at $10,000 per project. MTC, at its sole discretion, may approve more funds for this task for the successful completion of any particular project.

MTC will procure all the GPS clocks required for the projects. The project sponsors are responsible for installing the clocks at their signals. MTC will coordinate the installation of the clocks at Caltrans signals with the help of their staff and an electrical contractor. MTC will be actively involved in coordinating this task with all stakeholders. The clocks will be owned by the agency that owns the traffic signal. MTC will also provide spare GPS clocks to Caltrans that can be used to replace any malfunctioning clocks so as to keep the corridor in coordination.

As mentioned in Section 1, high priority will be given to those projects that interact with freeways and state highways and involve traffic signals from multiple jurisdictions. Projects that involve traffic signals owned by one local agency are considered to have low priority for PASS funding, unless they are part of a regional program, such as Safe Routes to Schools, Safe Routes to Transit, Complete Streets, SMART corridors, and Incident Management. Projects that satisfy the requirements in Section 1, but request only weekend timing plans, have low priority for PASS funding, unless the traffic volumes are equal to or above the weekday peak period volumes. The project sponsor must provide adequate documentation in the application to establish the need for weekend coordination in these corridors. It is the responsibility of the applicants to justify the need for any requested additional services as a part of the project.

2.2 Ineligible Projects

Projects that involve traffic signals that have been coordinated within the past three years are ineligible, unless a change has occurred to the state-owned portion of the system.

Projects that involve development of traffic signal coordination plans for future traffic volumes are also ineligible.

3 Project Selection Process

3.1 Call for Projects

The Call for Projects occurs once per year in the spring using a standardized application form. The new application released with the corresponding year's Call for Projects must be submitted to be considered for funding for that current cycle. Applications from prior or for future cycles will not be reviewed or approved. Applicants are given approximately one month for preparation of the application. All completed applications received by the due date listed in the Call for Projects will be evaluated by a panel consisting of MTC and Caltrans staff. Applications received after the due date will be returned unopened to the project sponsor without any exceptions.

Complete applications that clearly demonstrate how the proposed project meets the goals and objectives described in Section 1 will be given high priority for PASS funding. Projects that do not receive funding immediately will be placed on eligibility list, in case one or more approved projects can not be pursued. Unsuccessful project sponsors are encouraged to re-apply in subsequent cycles of the program to receive funding. New applications must be submitted for consideration since applications from prior cycles/years will not be considered or reviewed.

3.2 Waiver of Claims and Indemnification

Receipt of a PASS grant is contingent on the local agency's willingness to enter into an agreement with MTC to: (1) waive any and all claims against MTC for any loss liability or damages resulting from this program (directly or indirectly); and (2) indemnify, hold harmless, and defend MTC against any and all third party claims that may result from the agency's participation in the program. This agreement has to be executed by the person authorized to enter into agreements with MTC. An agency that requires peer review assistance will also be required to sign such an agreement in favor of the peer reviewer. When the Call for Projects is issued, the electronic version of this agreement will be available for download along with the project application from the MTC website at: http://www.mtc.ca.gov/funding/ or applicants may contact the MTC Project Manager directly.

It is recommended that the indemnification agreements be submitted to MTC along with the project application. All agencies (sponsor and participants) are encouraged to review this agreement with their attorneys to obtain approval before submitting an application. It is strongly recommended that the local agency start the indemnification agreement approval process as soon the application is filed in the spring, thus providing themselves with sufficient time to submit a signed agreement by the project commencement in the summer. The waiver and indemnification agreement must be on file with MTC within thirty (30) days of project approval notification. Please note that the MTC Project Manager is required to have this executed agreement on file **before** any work on the project can begin. If this agreement is not submitted, MTC, at it sole discretion, reserves the right to rescind the project approval and allocate these funds to other projects from the eligibility list.

Please note: The term of this Indemnification Agreement shall continue indefinitely, applying to multiple Consultant contracts, unless terminated by written notice of either party or superseded by another Indemnification Agreement. If your agency has a valid agreement on file from the PASS FY10/11 or FY 11/12 Cycles, you are not required to submit this agreement. If you have any questions regarding the existence or validity of your agency's agreement, please contact the MTC Project Manager directly. All participating agencies, including the primary sponsor, are required to sign this agreement with MTC to receive funding from the PASS.

3.3 Application

The Call for Projects outlines the detailed requirements and deadlines for submitting the project applications. The sponsoring agency is required to submit five hard copies of the completed application, including all supporting materials, and a PDF copy (e-mail or disc) to the MTC Project Manager. Faxed or e-mailed applications (without the hard copies) will not be accepted or considered. When the Call for Projects is issued, the electronic version of the project application will be available for download from the MTC website at: http://www.mtc.ca.gov/funding/ or applicants may contact the MTC Project Manager directly.

MTC does not require applicants to furnish proof of permission to apply or to provide the local match. It is the responsibility of each applicant to ensure all local funding and approval

requirements are met. For an applicant to apply on behalf of other agencies, the applicant must have the other agencies sign the application or submit letters of support for the proposed project that authorize the applicant to apply on their behalf. Applicants for projects that involve Caltrans traffic signals do not need to submit letters of support or signatures from Caltrans since these applications will be reviewed by MTC and Caltrans after submission. Project sponsors are required, however, to notify the appropriate Caltrans Traffic Operations staff about their PASS application if it includes any signals owned, operated, maintained or delegated by Caltrans.

3.4 Administrative Responsibility

MTC will administer and manage this program. Projects are defined by local agencies, evaluated by MTC and Caltrans staff, and assigned to consultants retained by MTC. Projects will be evaluated based upon how well the proposed project meets the goals and objectives described in Section 1. MTC will obligate federal funds through Caltrans; serve as the recipient of the federal funds; contract with consultants; approve consultant deliverables; and pay consultant invoices. Consultants are paid directly by MTC using a deliverable-based schedule as discussed in detail in Section 5: Scope of Work, Schedule and Budget.

3.5 Project Selection and Grant Award

The applications are evaluated by MTC and Caltrans staff, to determine projects with high-priority for funding. Successful project applicants will be notified after the approval by the MTC Operations Committee. Grants are awarded in the form of Consultant assistance, and MTC directly pays the Consultant at the successful completion of each project deliverable. To maximize the use of available funds for signal coordination, local agency staff costs are not typically reimbursed in part or full under the PASS. However, MTC understands some projects with a large number of signals require a significant amount of local agency staff time, and thus the funding of this task is solely at the discretion of MTC.

3.6 Consultant Assignment

It is MTC's intention to assign projects to consultants during the first cycle of the consultant contract based on equity, interview performance and prior experience with MTC. Consultant project assignments during the second and third years of the contract will reflect their performance during the prior years and the project sponsor preferences. Sponsors will be given an opportunity to indicate their consultant preferences in the application during these subsequent program cycles. Efforts will be made to assign consultants based on project sponsor preferences as indicated in the applications, but it is possible that the assigned consultant may not be the sponsor's first preference. MTC will work closely with all of the consultants and stakeholders to ensure the project is successfully completed as per the PASS guidelines. MTC will seek feedback by online surveys from all participating agencies and consultants to make changes/enhancements to the program at the end of every cycle.

3.7 Project Delivery

The assigned consultant contacts the project sponsor, other stakeholders, and MTC to schedule the kick-off meeting for the project. The kick-off meeting provides an opportunity to establish communication channels and protocols; discuss the scope of work, schedule, and budget; gather available information; and discuss the sponsor's goals and signal timing practices with the consultant.

All necessary technical correspondence occurs between the project sponsor, other stakeholders, and the consultant. MTC is copied on all technical correspondence. The role of MTC is to ensure that high quality, timely, and within-budget technical assistance is provided for the agreed upon scope of work. Any changes to the scope of work agreed upon at the kick-off meeting are subject to MTC approval and require a revised Workscope, Schedule and Budget.

All agencies that own or operate traffic signals within the project limits, as well as MTC, are required to review consultant deliverables in a timely fashion. MTC's review of deliverables focuses on adherence to the approved scope of work. Consultants are paid for each deliverable by MTC after both the project sponsor and MTC have approved the deliverable and all comments have been addressed. The consultant will directly invoice MTC for all the deliverables completed in the calendar month. Consultants are not permitted to submit more than one invoice in a calendar month without the approval of the MTC Project Manager.

The consultant has to allocate sufficient time for all the agencies involved to review and comment on the deliverable. Deliverable review time is set during the kick-off meeting. At the completion of each deliverable the consultant has to submit a 'Comment Response Sheet' incorporating the comments received from all agencies and the actions taken to address the comments. Any changes to the agreed upon schedule are subject to MTC approval.

The projects have to be completed within one year of the grant award. Projects with large number of signals and/or additional services that require extended schedule have to be approved by MTC. The project sponsors are required to notify MTC if there are issues in the project corridors after the field implementation and changes are made to the timing plans within one-year after the project is implemented.

4 Consultants

Please note: The Consultant procurement will not be done for every cycle of projects. In general, the RFQ for consultant selection will be issued the first year of the grant cycle (approx. once every three years.) There is no new procurement for consultants for the FY12/13 Cycle.

4.1 Selection

The consultants for the PASS are selected through a Request for Qualifications (RFQ). A panel consisting of staff from MTC and Caltrans will evaluate the Statement of Qualifications (SOQ) and conduct interviews, if necessary. The length of the consultant contracts are for one cycle of

the program with the option to renew for 2 more cycles at the sole discretion of MTC. This will help to evaluate consultants' performance during the first cycle of the program and allow MTC to make necessary changes accordingly. MTC retains two to four consultants selected after the RFQ process to provide technical assistance for projects under the program.

4.2 Qualifications

All PASS consultants have the following qualifications:

1. Lead staff with applied knowledge of, and expertise in:
   a. the principles of traffic signal timing and signal coordination;
   b. hardware and software used for traffic signal systems;
   c. analysis of recent collision history for susceptibility to correction through traffic signal timing and coordination; and,
   d. accommodating the needs of all users of arterials, including motorists, pedestrians, bicyclists, transit patrons, and transit vehicles in the context of traffic signal timing and coordination.
2. Lead and technical staff with experience in:
   a. the use of micro-simulation software for optimization of arterial signal coordination;
   b. implementation of timing plans using legacy and modern traffic signal system software and hardware; and,
   c. operation and programming of different types of controllers.
3. Lead staff with eight (8) or more years of experience in the areas of expertise noted above and California Civil or Traffic Engineer registration; and technical staff with three (3) or more years of experience in the areas of expertise noted above.

4.3 Evaluation

At the conclusion of each project, project sponsors are required to fill out and return to MTC a confidential consultant evaluation form. MTC will develop an online performance survey to conduct this evaluation. MTC uses the results of the evaluation to determine the number of projects that are assigned to the consultant in the subsequent years of the consultant contract and as a reference for future evaluations. This evaluation also helps MTC to make necessary changes or improvements to the program in subsequent cycles.

4.4 Indemnification of MTC and Client Jurisdictions

Consultant shall indemnify and hold harmless MTC, Caltrans and Client Jurisdictions, their commissioners, directors, officers, agents, and employees from any and all claims, demands, suits, loss, damages, injury, and/or liability (including any and all costs and expenses in connection therewith), incurred by reason of any negligent or otherwise wrongful act or omission of Consultant, its officers, agents, employees and subcontractors, or any of them, under or in connection with the contract; and consultant agrees at its own cost, expense and risk to defend any and all claims, actions, suits, or other legal proceedings brought or instituted against MTC, Caltrans or Client Jurisdictions, their commissioners, directors, officers, agents, and employees,

or any of them, arising out of such negligent or otherwise wrongful act or omission, and to pay and satisfy any resulting judgments.

The indemnification obligation shall not apply to liability arising from and caused by the adjudicated or admitted negligence or willful misconduct of MTC or any of the Client Jurisdictions. If the adjudicated or admitted negligence or willful misconduct of MTC or any of the Client Jurisdictions contributes to a loss, consultant shall not be obligated to indemnify such indenmitee for the proportionate share of such loss caused by such negligence or willful misconduct.

4.5 Insurance Requirements

Consultants are required to maintain insurance coverage during the term of the contract with MTC, to the limits as specified in the contract. MTC, Caltrans and Client Jurisdictions, their commissioners, directors, officers, representatives, agents, and employees are to be named as additional insureds. Such insurance as afforded by this endorsement shall be primary as respects any claims, losses or liability arising directly or indirectly from consultant's operations.

4.6 Ownership of Work Products

All drawings, designs, specifications, manuals, reports, studies, surveys, data, models, software, source code and source code documentation, documentation or system architecture and any other documents, materials, data and products (Work Products) prepared or assembled and furnished to MTC by consultant or its subconsultants shall be the property of MTC, and copies shall be delivered to MTC promptly upon completion of the work. Computer files generated from arterial analysis software packages including, but not limited to, Synchro and SimTraffic, and detailed signal timing sheets (Technical Work Products), shall be the property of the Client Jurisdiction that owns the traffic signal for which the work was done, and copies shall be delivered to the Client Jurisdiction promptly upon completion of the work.

Consultant hereby assigns to MTC and the Client Jurisdiction ownership of all right, title and interest in and to such Work Products and Technical Work Products, respectively, including ownership of the entire copyright in the Work Product and Technical Work Products, respectively. Consultant also agrees to execute all papers necessary for MTC or the Client Jurisdiction to perfect ownership of the entire copyright in the Work Product or Technical Work Product, respectively. Consultant shall be responsible for the preservation of any and all such Work Products and Technical Work Products as are lost, destroyed, or damaged while in its possession without additional cost to MTC and the Client Jurisdiction, respectively.

5 Scope of Work, Schedule and Budget

5.1 Scope of Work

The services to be performed by Consultant will consist of services requested by the MTC Project Manager or a designated representative including, but not limited to, the following:

0. Program Kick-Off

At the beginning of each annual cycle, Consultant shall meet with the MTC Project Manager to discuss Program guidelines and standardization of services, deliverable formats, and project administration. The deliverables shall be named and formatted as specified by the MTC Project Manager. The project administration guidelines applicable to the particular Cycle of PASS shall be discussed and reviewed at this meeting.

1. Project Start-Up

1.1. Project Kick-Off Meeting – Consultant shall schedule a meeting with the project sponsor, other involved agencies, and the MTC Project Manager or designated representative to kick-off the project; establish communication channels and protocols; discuss the scope of work, schedule, and budget; gather available information; and obtain a thorough understanding of the goals of the project. Specific topics to discuss include the turning movement data collection and times to collect travel time data.

1.2. Consultant may be asked to assist the local agencies in completing the Caltrans permit application for installation of GPS clocks. Consultant shall also make any edits to the application upon feedback from Caltrans permit staff. This task shall be considered an additional service and the approx. level of effort shall be included in the WSB.

1.3. Consultant may be asked to subcontract an electrical contractor or other firms or agencies with required licenses and expertise to install GPS clocks or other communications equipment at Caltrans signals for certain projects. The subcontractor has to be approved by Caltrans and MTC, and shall be required to secure a Caltrans permit. This task shall be considered an additional service and the Consultant shall be reimbursed for actual costs billed by the subcontractor.

1.4. Preparation of a Workscope, Schedule, and Budget – Consultant shall prepare a detailed Workscope, Schedule, and Budget (WSB) for review and approval by the project sponsor, other involved agencies, and the MTC Project Manager. Consultant shall finalize the WSB based on comments received from the project sponsor, other involved agencies, and the MTC Project Manager. This deliverable is invoiced after the approval of the Final WSB.

Deliverable 1A:	Draft Workscope, Schedule, and Budget
Deliverable 1B:	Final Workscope, Schedule, and Budget

2. Analysis of Existing Conditions

Consultant shall collect and analyze all information necessary to thoroughly understand existing traffic conditions in the study area and be able to develop optimal time-of-day traffic signal coordination plans and transit signal priority plans, if applicable.

2.1. Data Collection – Consultant shall collect existing conditions data including, but not limited to, the following:

2.1.1. From the project sponsor and other involved agencies, Consultant shall collect existing timing sheets, existing coordination plans, traffic signal as-built drawings, aerial photos, maps, and collision diagrams for the study intersections, if available.

2.1.2. From the project sponsor and other involved agencies, including transit agencies, if any, Consultant shall collect signal timing and signal priority preferences, including, but not limited to, those related to pedestrian and bicycle timing, leading and lagging left-turn phasing, and conditional service, as well as the timing optimization software preference.

2.1.3. Consultant shall conduct peak period turning movement counts at all study intersections, including pedestrian and bicycle counts, and seven-day 24-hour machine counts (ADT Counts) at strategic locations to determine periods of coordination. All counts shall be taken during times and days that are representative of the times and days for which coordination plans shall be developed. It is preferred that all counts be summarized in MS Excel format or in the format of the project sponsor's preference. It is preferred that Video Data Collection be used for this task as it helps with the validation of the data. Other data collection methods shall be considered based on the preference of the project sponsor or if video data collection is not feasible.

2.1.4. Consultant shall also collect the intersection and corridor-wide collision data for at least three years from the local agencies or other available sources.

2.1.5. Consultant shall include the costs for collecting the seven-day 24-hour machine counts (ADT Counts) as a part of the project at the rate of one ADT count for every four project signals. Any additional counts have to be approved by MTC, and billed at a negotiated rate.

2.1.6. Consultant shall provide to the MTC Project Manager electronic files of all turning movement counts, bicycle and pedestrian counts, ADT counts, collision data, all developed Synchro models, and controller and cabinet photos.

2.1.7. Consultant shall conduct a field review of all study intersections and street segments to verify lane geometry, speed limits, storage lengths, signal phasing, distances between intersections, and crosswalk lengths, unless the information is

available through other sources such as aerial photos and speed surveys. Consultant shall conduct a field review at key intersections to measure queue lengths and saturation flows for heavy movements.

2.1.8. Consultant shall conduct a field review to observe typical traffic patterns during the peak periods for which coordination plans shall be developed. Consultant shall note factors that are expected to affect signal progression including, but not limited to: intersections with high pedestrian or bicyclist volumes; over-saturated intersections; uneven lane distribution; high volumes of trucks and buses; high-volume unsignalized intersections, including interchanges; parking maneuvers; and presence and location of bus stops.

2.1.9. Consultant shall verify signal coordination and transit priority capabilities of existing equipment and communications infrastructure. Consultant shall take digital photos of the controller cabinet and the contents of the controller cabinet, unless waived by the system owner and/or MTC. The digital photos may be taken while collecting traffic counts, doing field observations or implementing the timing plans, as per directions from the MTC Project Manager.

2.1.10. Consultant shall conduct travel time and delay studies, including the number of stops, during times and days that are representative of the times and days for which coordination plans shall be developed. A minimum of four runs shall be conducted for each direction for each peak period. Travel time and delay studies shall be conducted using the floating car method. The time of performance of the travel time and delay studies shall be defined at the kick-off meeting.

2.2. Analysis of Existing Conditions – Consultant shall analyze the data obtained from Task 2.1 as follows:

2.2.1. As permitted by the project stakeholders, Consultant shall review initial and actuated settings for each study intersection to identify opportunities to minimize delay during non-coordination periods and enhance pedestrian and bicyclist safety. The analysis shall include, but not be limited to, review of minimum and maximum green settings; yellow and red times; pedestrian timing; and gap, extension, and reduction settings.

2.2.2. Consultant shall review collision diagrams for the study intersections, if available, to identify patterns that are susceptible to correction through signal timing.

2.2.3. Using software specified by the project sponsor, Consultant shall develop a model of the study area and calibrate the model based on field observations of existing conditions. Signal coordination optimization software may include, but not be limited to, Synchro, TRANSYT 7-F, or PASSER. Transit signal priority modeling software may include, but not be limited to, VISSIM or Paramics. Consultant shall calibrate the model based on travel time and delay studies and field observations of queue lengths and saturation flows for heavy movements at key intersections.

2.2.4. Consultant shall summarize the results of the existing conditions analyses in Deliverable 2A: Draft Existing Conditions Report. At a minimum, the report shall include: description of the roadway network and surrounding land uses, including a map showing the study intersections; description of traffic volumes, including day-to-day variability and directionality; description of traffic signal controllers and communication capabilities; identification of factors that are expected to affect progression; results of analysis of initial and actuated settings; description of collision patterns that may be susceptible to correction through signal timing; measures of effectiveness, including delay, number of stops, and travel time from the travel time and delay studies, and fuel consumption and emissions using a methodology specified by MTC; and model calibration results, including a summary of changes to the optimization software's default values.

2.2.5. Consultant shall meet with the project sponsor and other involved agencies to present and discuss the analyses and field observations, if required. Consultant shall finalize the report based on comments received from the project sponsor, other involved agencies, and the MTC Project Manager. Consultant shall submit to all stakeholders a Response to Comments sheet addressing all the comments/concerns received, while submitting the final Deliverable 2B: Final Existing Conditions Report.

Deliverable 2A:	Draft Existing Conditions Report, including computer model with existing timings
Deliverable 2B:	Final Existing Conditions Report, including computer model with existing timings

3. Development of Recommendations

3.1. Consultant shall develop the optimal time-of-day coordination plans after analyzing the signal grouping; phasing and phase sequence, including conditional service; cycle lengths, splits, offsets; collision diagrams/data and other available data. The Consultant shall meet with the project stakeholders to discuss their preference for signal grouping and cycle lengths before submitting the Draft Recommendations. This shall be done by submitting an interim deliverable on signal groupings and cycle lengths for review by project stakeholders.

3.2. Consultant shall develop recommendations of optimal initial and actuated settings; time-of-day coordination plans and hours of coordinated operation; and transit signal priority plans and hours of operation, if applicable.

3.3. Consultant shall summarize recommendations in the Deliverable 3A: Draft Recommendations Report. The report shall also include a comparison of existing and proposed timings and a description of expected improvements.

3.4. Consultant shall follow the applicable state and federal standards in making these recommendations. Any exceptions need to be discussed in detail with the project sponsors and stakeholders, and the MTC Project Manager.

3.5. Consultant shall meet with the project sponsor and other involved agencies to discuss the recommendations, if required. Consultant shall finalize the Report based on comments received from the project sponsor, other involved agencies, and the MTC Project Manager. Consultant shall submit to all stakeholders a Response to Comments sheet addressing all the comments/concerns received, while submitting the final Deliverable 3B: Final Recommendations Report.

Deliverable 3A:	Draft Recommendations Report, including computer model with recommended timings
Deliverable 3B:	Final Recommendations Report, including computer model with recommended timings

4. Implementation and Evaluation

4.1. Consultant shall develop the marked-up final timing sheets for implementation in the format of choice of the project sponsor.

4.2. Consultant shall prepare for review and approval by the project sponsor and other involved agencies appropriate timing sheets based on the approved timing plans. Consultant shall revise the timing sheets based on comments received from the project sponsor and other involved agencies.

4.3. Consultant shall assist with the preparation and approval of the Caltrans permit for projects involving installation of GPS clocks at Caltrans signals if needed. MTC will procure all the GPS clocks required for the project. The GPS clocks shall be installed by the electrical contractor at Caltrans signals. The Caltrans traffic operations staff will be present during the installation to configure the clocks. MTC will be actively involved to coordinate this task with all stakeholders.

4.4. Consultant shall implement, or assist agency staff in the implementation of, the new settings and timings. Implementation may have to be done in the field or from a central location, depending upon communication capabilities and agency preferences.

4.5. Consultant shall fine-tune, or assist agency staff in the fine-tuning of, the new settings and timings. Consultant shall fine-tune timings in the field and record all changes. Fine-tuning shall be conducted during times and days that are representative of the times and days for which coordination plans were developed. This also requires additional field visits to verify and assess any changes made during the fine-tuning process.

4.6. Consultant shall conduct travel time and delay studies, including number of stops, at the key corridors identified under Task 2.1.7. Travel time and delay studies shall be

conducted during times and days that are representative of the times and days for which coordination plans were developed. A minimum of four runs shall be conducted for each direction for each peak period. Travel time and delay studies shall be conducted using the floating car method.

4.7. Consultant shall calculate measures of effectiveness of the improved system, including delay, number of stops, travel time, fuel consumption, emissions, benefit-cost, and cost effectiveness for emissions reductions. The methodology for calculating fuel consumption, emissions, benefit-cost, and cost effectiveness for emissions reductions will be specified by the MTC Project Manager.

4.8. Consultant shall also calculate the measures of effectiveness for transit achieved with the signal coordination for certain projects, as identified in the kick-off meetings. Only travel-time and speed shall be evaluated as a part of this effort since fuel consumption and emissions reduction benefits are almost negligible with many transit agencies using zero-emission or hybrid vehicles. The Benefit-Cost analysis methodology shall be developed by MTC to incorporate these benefits. The level of effort involved for this task is considered as an additional service and shall be finalized with the WSB.

4.9. Consultant shall submit the Deliverable 4B: Final Project Report, which shall include but not be limited to: the final periods of coordination; changes between the timings recommended under Task 3 and the final timings that were implemented; the number of locations where changes were made to better accommodate pedestrians and/or bicyclists; and the results of the evaluation of measures of effectiveness.

4.10. Consultant shall assist MTC in producing the Fact Sheets for each project by providing the required maps, tables, data or text as requested by the MTC Project Manager.

Deliverable 4A:	Implementation and Fine-tuning, including final timing sheets
Deliverable 4B:	Final Project Report with Benefit-cost Analysis, including the final computer model

5. Additional Services (AS)

5.1. In addition to the basic signal coordination, the scope of the PASS program includes providing additional services like developing incident management flush plans, transit signal priority plans, traffic responsive timing plans, weekend timing plans, additional timing plans, conducting technical studies, feasibility studies, an evaluation of transit benefits, etc. These services shall be requested by the project sponsor in the application and shall be included in the WSB, contingent on approval by MTC. Consultant may also be requested to perform these additional services for any projects retimed in the last two years under the PASS. Such services may increase the scope of the work to include additional meetings, additional data collection, field visits, technical analyses, studies, fine-tuning, conditional diagrams, updating Visio coversheets, etc.

5.2. Upon MTC approval, Consultant shall include a detailed description of the scope of the additional service, a staffing plan, and a level of effort estimate in its WSB. The scope and budget of these services shall be negotiated on a case-by-case basis. If these tasks cannot be reasonably negotiated, MTC, at its sole discretion, can withdraw the project assignment to the Consultant and assign a different Consultant to the project. The payment schedule shall be negotiated to compensate for the tasks completed and finalized in the WSB. Additional services may also be requested by Consultant after the WSB has been approved by requesting an amendment to the approved WSB. After MTC approval, any change to the scope or budget must be included in a revised WSB and sent to all project stakeholders.

5.3. Consultant may be asked to assist the local agencies in completing the Caltrans permit application for the installation of GPS clocks. Consultant shall also make any edits to the application upon feedback from the Caltrans permit staff. This task shall be considered an additional service and the level of effort shall be included in the WSB.

5.4. Consultant may be asked to coordinate the installation of GPS clocks with the electrical contractor.

5.5. Consultant may be asked to subcontract an electrical contractor or other firms or agencies with required licenses and expertise to install GPS clocks or other communications equipment at Caltrans signals for certain projects. The subcontractor has to be approved by Caltrans and MTC, and shall be required to secure a Caltrans permit. This task shall be considered an additional service and the Consultant shall be reimbursed for actual costs billed by the subcontractor.

5.6. Consultant may be asked to prepare presentation materials and/or make formal presentations on the PASS project to various policy boards and commissions. This task shall be considered an additional service and the level of effort shall be negotiated and included in the WSB.

5.7. Consultant may be asked to assist the MTC Project Manager with developing outlines, identifying project examples and speakers, coordinating with speakers, and preparing or presenting materials at seminars or workshops conducted by MTC in accordance with the Arterial Operations program objectives. The budget and payment schedule for these additional services shall be based on the level of effort required for the tasks and outlined in a separate WSB that shall be negotiated and approved by MTC.

6. Reduced Services

Consultant may be requested to perform only some of the services above in cases where some services are already available, or MTC, Caltrans or Client Jurisdiction staff wishes to perform them themselves. Should reduced services be requested, Consultant shall identify in its WSB which tasks shall be performed by the Consultant and which shall be performed by MTC, Caltrans or Client Jurisdictions. The fee for reduced services shall be a percentage of the base fee per intersection or a negotiated amount, which is commensurate with the proportion of services to be performed by Consultant. Deliverables shall be negotiated on a case-by-case basis.

5.2 Schedule

#	Task	Timeline for PASS FY12/13 Cycle
0.	Call for Projects	March 2012
	Application Evaluations	April 2012
	Project Approval/Notification	June 2012
1.	Project Start-Up	
	- Kick-Off Meetings	July 2012
	- Workscope, Schedule, and Budget	August 2012
2.	Analysis of Existing Conditions	
	- Data Collection	September 2012
	- Analysis	October 2012
3.	Recommendations	January 2013
	- Final Timing Sheets	February 2013
4.	Implementation and Evaluation	March/April 2013
	Final Project Report	May 2013

5.3 Budget

5.3.1 Signal Coordination

MTC will pay consultants on a fixed-fee basis, based on the following fee schedule.

Service (Tasks 0 through 4)	# of Scenarios*	Amount Due
Time-of-day signal coordination with timings implemented remotely from intersection, e.g., via dial-up or from traffic management center	3	$2350 per intersection
	2	$2100 per intersection
Time-of-day signal coordination with timings implemented in the field	3	$2550 per intersection
	2	$2300 per intersection

* Scenario = morning, off-peak/midday, or afternoon peak periods

5.3.2 Additional Services

MTC recognizes that some projects may require additional analyses, or have approved additional services as identified in *Task 5: Additional Services* of *Section 5.1: Scope of Work.* The budget and payment schedule for these additional services is based on the level of effort to complete these tasks, and is negotiated before finalizing the WSB. If any of these cannot be reasonably negotiated, MTC, at its sole discretion, can withdraw the project assignment to the consultant and assign a different consultant to the project.

5.3.3 Payment Schedule

MTC will pay consultants by deliverable-based tasks based on the following payment schedule. The Consultant will submit the invoices directly to MTC Accounting. MTC will approve the payment after both the project sponsor and the MTC Project Manager have approved the deliverable.

Task	Deliverables (#)	Payment
1.	Draft and Final Workscope, Schedule and Budget (#1A and #1B)	5% of Project Budget
2.	Draft Existing Conditions Report (#2A)	35% of Project Budget
	Final Existing Conditions Report (#2B)	10% of Project Budget
3.	Draft Recommendations Report (#3A)	15% of Project Budget
	Final Recommendations Report (#3B)	10% of Project Budget
4.	Implementation and Fine-tuning (#4A)	15% of Project Budget
	Final Project Report with Benefit-cost Analysis (#4B)	10% of Project Budget
5.	Additional Services	To Be Negotiated
6.	Reduced Services	To Be Negotiated

METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel: 510.464.7700
TDD/TTY: 510.464.7769
Fax: 510.464.7848

Memorandum

TO: Arterial Operations Committee DATE: January 03, 2012

FR: Danielle Stanislaus; Vamsi Tabjulu W. I.: 1234

RE: **AOC Work Plan 2012**

The goals of MTC's Arterial Operations Program are: 1) to provide technical and financial assistance to local agencies in their efforts to improve arterial operations and safety; 2) to develop and implement initiatives that improve overall arterial operations and safety; and 3) to support the AOC as a forum for discussion of shared issues and innovative, practical solutions to those issues. The AOC will guide the work performed as part of the Arterial Operations Program.

The following Work Plan presents the outline for work to be performed to help achieve these goals in 2012:

AOC Meeting[1]	Tech Transfer	PASS FY11/12 Cycle	PASS FY12/13 Cycle	AOC Featured Presentations
Jan. 10, 2012		Recommendations Review and Deferred Projects to Start	Draft Guidelines for Review	Members are requested to volunteer to make brief presentations on topics/projects of interest to the AOC. Please notify Vamsi of your interest to present at any of the future meetings.
Mar. 13, 2012	Seminar on HCM 2010 & CA MUTCD 2011: Updates Relating to Arterials (Date: TBD)	Project Implementation March – May 2012)	Call for Projects	
May 8, 2012		Project Completion and Final Reports Due (June 2012)	Application Review (May 2012); Ops Committee Approval and Notifications (June 2012)	
July 10, 2012			Kick-off Meetings (July-Aug. 2012)	
Sept. 11, 2012	Seminar Topic TBD (Sept./Oct. 2012)		Finalize Project Workscope, Schedule and Budgets	
Nov. 13, 2012			Deliverable Review and Project Updates	

[1] Please note that the dates listed are the standard meeting dates falling on the second Tuesday of odd-numbered months (Jan., Mar., etc.). Any changes to these dates/times will be discussed at the meetings.